

Western Washington Riparian Desired Future Condition Validation Study

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The purpose of this study is to validate the Desired Future Condition (DFC) targets used to regulate timber harvest within conifer-dominated riparian management zones (RMZs) along fish-bearing (Type F) streams in western Washington under the state forest practices rules. The DFC targets are expressed in basal area per acre and are intended to represent stand conditions in unmanaged mature riparian forests. The targets vary by site class. When landowners propose to harvest timber from the inner zone of an RMZ they are required to conduct an inventory of the stand and use a model (the DFC model) to predict tree growth and mortality to stand age 140 years. If the projected basal area at age 140 years exceeds the target then harvest of ‘excess’ basal area is allowed, while if it is below the DFC target no harvest is allowed. There is scientific uncertainty about the targets currently in use due to the limited amount of existing data available to characterize mature, unmanaged riparian stand conditions. To address this issue, data were collected from a random sample of 113 mature (80-200 year old) conifer-dominated western Washington riparian stands. Plots were 164 ft long and varied in width to match the combined widths of the core and inner zones of the regulatory RMZ for each site as defined by site class. Each plot was adjacent to a stream or channel migration zone and was dominated by conifer trees between 80 and 200 years of age with no evidence of past timber harvest. Sampling was stratified by site class so the DFC target for each site class could be compared to sites with similar growing conditions. The study results indicate:

- There was a discrepancy between the site class indicated on maps and estimates derived from field measurements at 74% of the sites. The field site class measurements indicated higher site quality than the map site class in the majority of cases (59%).
- Mean live conifer basal area per acre was greater than the existing DFC performance target values for all site classes. The differences were statistically significant at $P < 0.01$.
- Mean basal area per acre decreased with declining site quality but the differences between site classes were not statistically significant. No pattern was evident between basal area per acre and map-based site class, likely due to the unreliability of the site class maps.
- Site and stand attributes explained little of the variability in basal area per acre. Only 3 of 16 independent variables (dominant tree species, precipitation and site index) had significant relationships with live conifer basal area per acre. The difference in live conifer basal area per acre between stands dominated by Douglas-fir and western hemlock was significant but sample size was not large enough to test for differences among other stand types.
- None of the eight alternative parameters evaluated appeared to be clearly superior to basal area per acre as a measure of mature stand condition. Volume per acre appeared useful in distinguishing mature stands from younger, harvest-age stands because it integrates tree height, diameter and density. Use of a measure that integrates trees per acre and quadratic mean diameter may merit further investigation.

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